

REMARKS

Applicant's counsel thanks the Examiner for the careful consideration given the application. The specification has been amended as the Examiner has requested. The claims have been amended to cure the concerns under Section 112 second paragraph, and to more clearly define the invention.

1. Claim amendments and basis therefor

1.1 Amended claim 28

Currently amended claim 28 contains the subject-matter of previously presented claims 28, 38, 43 and 44. Furthermore, in order to more clearly distinguish the subject-matter from the prior art, a number of features of previously presented claim 28 have been made more explicit in the amended claim 28.

Those features of amended claim 28 which are known in combination from WO 01/77563A have been placed in the preamble of amended claim 28.

The amendments, successively occurring in the formulation of amended claim 28, are explained as follows.

1.1.1 Regarding the preamble of amended claim 28:

- The feature "the envelope is modular to form with similar suppression elements a tube" has been replaced by "the envelope is modular to form, *in circumferential direction of the tubular element (100)*, with similar suppression elements a tube". This replacement has a basis in the application as filed on page 3, lines 15-22.
- As an editorial change, the word "a" occurring in the last line of previously presented claim 28 between "envelops" and "tubular", is replaced with the word "*the*" in the amended claim 28.
- Amended claim 28 further specifies that "*the suppression element (1) has, in a longitudinal direction (A) of the suppression element (1), a first longitudinal direction (A) end (10) and an opposing second longitudinal direction (A) end (11)*". The longitudinal direction, as well as the first and second longitudinal direction ends are disclosed in the application as filed, e.g. on page 7, lines 2 and 3.

- To the features "at least one projection (3) pointing away from the envelope" there has been added the text "*for reducing the formation of vortices on the downstream side of the tubular element (100)*". This addition has a basis in the application as filed on page 3, lines 7-8.

- The specification that "*the projection (3) extends in the longitudinal direction (A) and lies at an inclined angle to the longitudinal direction (A)*" is adopted from previously presented claim 38. Note, that in this phrase the word "*inclined*" has been inserted before the word "*angle*". The inclined nature of the angle is evidently derivable from page 3, lines 10-14 of the application as filed, in which it is referred to spiral/helical shapes.

- The specification that "*a directing element (6-8) for positioning the suppression element (1) relative to another such similar suppression element*" is adopted from previously presented claim 43.

- To the last mentioned features there has been added the text "*such that the first end (10) of the suppression element (1) adjoins the second end (11) of the other suppression element*", which has a basis in the application as filed on page 7, lines 5-7, as well as in Figs. 1, 2 and 4.

1.1.2 Regarding the characterizing portion of amended claim 28:

- The further specification that "*the projection (3) extends from a first longitudinal direction (A) projection end of the projection (3) near the first end (10) of the suppression element (1) to a second longitudinal direction (A) projection end of the projection (3) near the second end (11) of the suppression element (1)*" has a basis in the application as filed, e.g. on page 7, lines 26-30, as well as in Figs. 1, 2 and 4.

- The specification that "*the directing element (6-8) comprises means for positioning the projection (3)*" is adopted from previously presented claim 44.

- To the last mentioned features there has been added the text "*such that its first projection end adjoins a second projection end of another similar projection of the other suppression element, enabling the projections of several suppression elements to be connected to each other, as a result of which an elongate continuous projection can be obtained*", which has a basis in the application as filed on page 7, line 26 – page 8, line 8, as well as in Fig. 4

1.2 Amended claim 37:

The replacement of the word "*in*" by "*transverse to*" is a correction of an evident error. This replacement has a basis in the application as filed on page 3, line 25, where it is stated: "Transverse to the longitudinal direction A".

The insertion of the words "*up to*" before "*3 degrees*" has a basis in the application as filed on page 3, line 25 – page 4, line 2. Cf. for example "... *slightly smaller or greater, such as between...*".

In view of the Examiner's objection to the phrase "such as, for instance, 118.5 degrees", this phrase has been deleted.

1.3 Amended claim 42:

This claim has been clarified in order to overcome the Examiner's objection to this claim.

1.4 Amended claim 55:

In view of the Examiner's objection to this claim, the claim is amended such that the relevant features of the mold are recited now.

1.5 Cancelled claims:

In the amended claim set, the previously presented claims 38, 43 and 44 have been cancelled, since the corresponding subject-matter of said claims has already been included in the currently amended claim 28.

2. 35 USC 102 - Novelty

It is observed that WO 01/77563A discloses a first embodiment of a suppression element for vortex vibrations, this first embodiment being shown in Figs. 1–4 of WO 01/77563A. The first embodiment of WO 01/77563A comprises the features of the preamble of amended claim 28. That is, the semi-tubular sections 12', the part-helical strakes 24 and the spigot and socket portions 16, 18 of WO 01/77563A's first embodiment correspond, respectively, to the "suppression elements", the "projections" and the "directing element" of the preamble of amended claim 28 of the present application.

However, WO 01/77563A does not disclose that its first embodiment has the distinguishing features of the characterizing portion of amended claim 28 of the present application. That is, WO 01/77563A does not disclose that a part-helical strake 24 extends from a first strake end near a first longitudinal direction

end of the tubular section 12' to a second strake end near an opposing second longitudinal direction end of the tubular section 12'. Neither does WO 01/77563A disclose means for positioning strakes 24 of adjoining tubular sections 12' in the way as mentioned in the characterizing portion of amended claim 28 of the present application. Note, that the relative positioning of projections according to the features in the characterizing portion of amended claim 28 of the present application results into a *circumferential*-direction-staggering of longitudinally adjoining suppression elements as disclosed in Fig. 4 of the present application. WO 01/77563A does not disclose such relative positioning of projections, which is a consequence of the different nature of WO 01/77563A's semi-tubular sections 12' and their strakes 24. Instead, WO 01/77563A discloses, on page 5, lines 13-18 a *longitudinal*-direction-staggering of longitudinally adjoining semi-tubular sections 12' by approximately half *the length* of such sections.

Also, at least said distinguishing features of amended claim 28 are not disclosed by any of the other documents cited.

In view of the above, the subject-matter of amended claim 28 is novel.

3. 35 USC 103 - Nonobviousness

WO 01/77563A is considered as the closest prior art. As explained above, WO 01/77563A does not disclose the distinguishing features of the characterizing portion of amended claim 28.

The underlying problem is to improve the bond in a tube made up of interconnected ones of a plurality of identical suppression elements of the type specified in the preamble of amended claim 28, wherein the projections of the interconnected suppression elements inter-adjoin to form an elongate continuous projection of the tube.

To emphasize the importance of such an improved bond, please note that the tube in operation is exposed to extensive and extensively varying loads due to water currents. Also, the tube may experience, in its typically harsh operation conditions, collisions with external objects. Therefore, it will be clear that an improved bond between connected suppression elements results in a longer lifetime and lower maintenance of the tube.

The distinguishing features of the characterizing portion of amended claim 28 provide a solution for the said problem. That is, since the projection lies at an inclined angle to the longitudinal direction and extends from its first projection end near the first longitudinal direction end of the suppression element to its second projection end near the second longitudinal direction end of the suppression element, the positioning of the projection such that its first projection end adjoins a second projection end of another

projection of another suppression element does not only result into an elongate continuous projection, but also into a *circumferential*-direction-staggering of longitudinally adjoining suppression elements, such as for example shown in Fig. 4 of the present application. This Fig. 4, for example, clearly illustrates that the tube portion 102 in the right hand side of the figure is, in circumferential direction, staggered relative to the tube portion 101 in the left hand side of the figure. This staggering provides an effective bond between the interconnected suppression elements.

The fact that, according to amended claim 28, the directing element for positioning suppression elements relative to one another comprises the means for positioning the projections of suppression elements in adjoining relation relative to one another, makes it easy to build up a tube exhibiting such bond.

Once a tube containing a great plurality of such tube portions of suppression elements is in operation, it could happen that one suppression element comes loose from the tube, for instance due to collision by external objects. In such incidence, the explained circumferential-direction-staggering of suppression elements ensures that the vorticity suppressing characteristics of the tube are affected only locally. For example, the elongate continuous projection of the tube will remain intact over the rest of the tube. Also, thanks to the improved bonding, the loss of one suppression element will cause no or negligible risk that suppression elements in the tube which were longitudinally adjacent to the concerning suppression element that came loose, tend to shift into the tube gap created by the lost suppression element.

As stated under section 2 (Novelty) above, WO 01/77563A does not disclose that its first embodiment has the distinguishing features of the characterizing portion of amended claim 28 of the present application. Instead, WO 01/77563A discloses, on page 5, lines 13-18 a *longitudinal*-direction-staggering of longitudinally adjoining semi-tubular sections 12' by approximately half *the length* of such sections. Note, that in Fig. 2 of WO 01/77563A it can be seen that the strakes 24 of adjacent semi-tubular sections connect to each other at *longitudinal* sides of the semi-tubular sections (cf. the strake 24 in the upper-right part of Fig. 2). In case of losing one such semi-tubular section 12', the casing's semi-tubular sections which were longitudinally adjacent to the section that came loose, tend to shift into the tube gap created by the lost section 12'. This longitudinal shifting tendency is not only present for the semi-tubular sections directly adjacent such gap, but also for the semi-tubular sections further away from the gap, due to a *domino effect* that occurs. Such domino effect can have deteriorating influence over a great length of the casing. Furthermore, in case of such longitudinal shiftings of many semi-tubular sections, the elongate continuous character of the strakes will be affected at many locations, since in WO 01/77563A the strakes connect to one another at *longitudinal* sides of the sections. Thus, the vorticity suppressing characteristics of the casing will then be affected over a great length of the casing.

Note, that if a domino effect would occur for the suppression elements according to amended claim 28 of the present application, its negative effect would only be very restricted, that is, only to a single tube portion, such as the tube portion 101 or 102 of Fig. 4 of the present application.

Starting from WO 01/77563A and being confronted with the task of providing a solution for the abovementioned underlying problem, there is no indication in the prior art that would prompt the skilled person to apply the solution provided by amended claim 28.

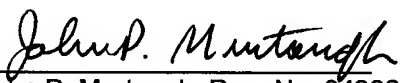
Therefore, it is clear that amended claim 28 is nonobvious over the prior art.

Claim 28 is accordingly now in condition for allowance. The remaining claims all depend directly or indirectly from claim 28 and accordingly are allowable as depending from an allowable base claim. For all these reasons the claims are now in condition for allowance, which is respectfully requested.

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Respectfully submitted,

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